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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/783,763 | 02/20/2004 | Whonchee Lee | 108298758US | 7390 |

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| EXAMINER | |
|---|---|
| CHEN, KIN CHAN | |
| **ART UNIT** | **PAPER NUMBER** |
| 1765 | |

DATE MAILED: 04/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/783,763 | LEE, WHONCHEE | |
| | Examiner | Art Unit | |
| | Kin-Chan Chen | 1765 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02102006;03152006*; 07/18/06.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. Claims 1–31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claims 1 and 17, "controlling formation of the gap in the polishing liquid to **achieve a desired electropolishing rate**" is new matter.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over So (US 6,893,328).

In a method for ECMP, So teaches that a microfeature workpiece may be contacted with a polishing surface of a polishing medium. The workpiece may be placed in electrical communication with a first electrode and a second electrode, at lest one of the electrodes may be spaced apart form the workpiece. A polishing liquid may be disposed. At least one of the workpiece and the polishing surface may be moved (rotated) relative to the other. The electrical current may be passed through and the electrodes and the workpiece to remove material from the workpiece while the workpiece contacts the polishing surface. At least a portion of the polishing liquid may be passed through at least one recess in the polishing surface so that a gap on the polishing liquid is located between the workpiece and a surface of the recess facing toward the workpiece. See Figs. 1-4A. col. 4, lines 24-30; 49-67; col. 5, lines 1-5; col. 6, lines 18-32, 45-52; col. 7, line 17, lines 53-60; col. 8, lines 53-56.

So teaches gap is formed and located at least partially in the recess (see Fig. 2A and Fig. 4A showing the gaps which is not filled with the polishing liquid). Since the dimensions of groove and indent are adjusted for the required flow rate of the polishing liquid (e.g., Table 1). It would have been obvious to one with ordinary skilled in the art that the corresponding gaps are formed accordingly, and the size of gap is a function of the flow rate of polishing liquid, and therefore a function of electropolishing rate. As such, it makes applicant's disclosure of "controlling formation of the gap in the polishing liquid to achieve a desired electropolishing rate" obvious.

***"A reference is good not only for what it teaches but also for what one of ordinary skill might reasonably infer from the teachings. In re Opprecht 12 USPQ 2d 1235, 1236 (CAFC 1989); In re Bode USPQ 12; In re Lamberti 192 USPQ 278; In re Bozek 163 USPQ 545, 549 (CCPA 1969).***

The limitations of dependent claims 15, 16, 23, and 24 have been also addressed above and rejected for the same reasons, supra.

As to dependent claims 2, 5, 6, and 7, see col. 8, lines 53-65.

As to dependent claims 11, 12, 13, and 21, see col. 6, lines 24-33.

As to dependent claim 4 (also for the limitation in claim 17), see Figs 2A and 3A and the description in col. 6.

The above-cited claims differ from the prior art by specifying well-known features (such as using polishing liquid having TMAH in claims 14 and 22) to the art of semiconductor device fabrication (the examiner takes official notice) and using various processing parameters (such as claims 3, 10, 18, 20, 25, 27,and 29). However, So (col. 6, lines 24-29; col. 7, lines 50-56) teaches allowing space between electrode and substrate. The space allows polishing fluid to flow between substrate and electrode. As such, the size of the space affects the volumetric flow rate of polishing fluid, therefore affects the removal rate of the substrate. So also teaches adjusting the electropolishing removal rate by changing the electric current density (col. 7, lines 53-56). Furthermore, So (col. 8, lines 45-60) teaches adjusting pressure of polishing pad and revolutions – per-minute (rpm) of the workpiece or pad that change the electrochemical-mechanical polishing rate. Therefore, So clearly shows that electropolishing rate and electrochemical-mechanical polishing rate are result-effective variables. Since same are known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result is obvious to one of ordinary skill in the art. In the absence of showing

criticality, it is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify So by performing routine experiments (by using various processing parameters) to obtain optimal result (such as removing a first portion of the material by electrochemical-mechanical polishing and removing a second portion less than the first portion by direct electropolishing) and adding any of same well-known features to same in order to provide their art recognized advantages and produce an expected result with a reasonable expectation of success. It is noted that applicant did not traverse the aforementioned conventionality (e.g., well-known features, common knowledge), which have been stated in the previous office action (December 15, 2005).

As to dependent claims 8, 9, and 19, since So teaches rotating the workpiece using various rpm which is adjustable depending on the polishing rate requirement for the specific product (col. 8, lines 57-60). Since it is known to be result effective variable and commonly determined by routine experiment. In the absence of showing criticality or unexpected result, it would have been obvious to one with ordinary skill in the art to modify So by performing routine experiments (by using various rpm) to obtain optimal result with a reasonable expectation of success.

***Response to Arguments***

4. Applicant has argued that So teaches that if the space is small, arcing or short-circuiting of he electrical path can occur, therefore, it may not be suitably

manipulated for controlling the electropolishing rate. It is not persuasive. So teaches that if the space is small, arcing or short-circuiting of he electrical path can occur, thus, So would have indicated to one skilled in the art the space is a result-effective variable (also see Table 1 in col. 5 bridging to col. 6) that there are situations in which some problems may occur. So would have led one skilled in the art to determine the space, through no more than routine experimentation. Furthermore, As has been stated in the office action, So teaches gap is formed and located at least partially in the recess (see Fig. 2A and Fig. 4A showing the gaps which is not filled with the polishing liquid). Since the dimensions of groove and indent are adjusted for the required flow rate of the polishing liquid (e.g., Table 1). It would have been obvious to one with ordinary skilled in the art that the corresponding gaps are formed accordingly, and the size of gap is a function of the flow rate of polishing liquid, and therefore a function of electropolishing rate. As such, it makes applicant's disclosure of "controlling formation of the gap in the polishing liquid to achieve a desired electropolishing rate" obvious.

## *Conclusion*

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 18, 2006

K-C Chen

Kin-Chan Chen
Primary Examiner
AU 1765